

R E M A R K S

This is in response to the Office Action that was mailed on September 20, 2004. The title is amended to more specifically describe the present invention. Minor idiomatic changes are made to the specification. Claim 28 is amended to clarify that the step of adjusting flow of the vapor components is conducted in order to perform the stripping operation. See e.g. the paragraph beginning in the 9<sup>th</sup> line on page 17 of the specification ("Flow adjustment valve 57 is controlled in accordance with the indication on flow meter 56 so that quantity of flow is brought to the quantity of flow with which adequate stripping is possible"). New claim 34 is based upon disclosure including that in the paragraph bridging pages 17-18 and in the first full paragraph on page 18 of the specification ("The hydrogen component comprising hydrogen sulfide, etc., is sent from peak 55 of high-pressure separation cell 53, or from peak 63 of high-pressure separation peak 61, to hydrogen recycling unit 21"). New claims 35 and 38-43 correspond, respectively, to former claims 22-27 and 33. Claims 35 and 43 have also been simplified somewhat. New claims 36 and 44 recite features based upon such disclosure as that appearing in the first full paragraph on page 17 of the specification ("Flow adjustment valve 57 is controlled in accordance with the indication on flow meter 56 so that

quantity of flow is brought to the quantity of flow with which adequate stripping is possible"). New claims 37 and 45 are based upon disclosure including that in the paragraph bridging pages 17-18 and in the first full paragraph on page 18 of the specification ("Some of the pressurized recycled hydrogen is mixed with make-up hydrogen 23 obtained by the hydrogen production process (not shown) and sent from hydrogen nozzle 40 to bottom space 36. ... The remainder of the pressurized recycled hydrogen becomes hydrogen gas 20 that has been preheated by heat exchanger 51 and is mixed with preheated oil 10 and used for hydrorefining at first catalyst layer 33"). New claims 46-48 recite a valve tray, in accordance with such disclosure as that in the paragraph bridging pages 9-10 of the specification. No new matter is introduced by this Amendment. Claims 28-32 and 34-48 are pending in the application.

Examiner Griffin kindly discussed the present application and the present Amendment with Applicants' representative Richard Gallagher on January 5, 2005 and on January 10, 2005. After due consideration, Examiner Griffin indicated that the present Amendment would overcome all of the rejections of record.

*DISTINCTION BETWEEN THE PRESENT INVENTION AND CASH.* The Examiner's position is that stripping is accomplished by the Cash apparatus to some extent. The Examiner hypothesizes that stripping might occur at the bottom of the sieve tray in Cash. However, Cash clearly discloses that the sieve tray restricts backflow of cooler pure gas to the withdrawal device. Column 3, lines 1-4. That is, the Cash apparatus is structured so that hydrogen does not flow countercurrent to the oil from the first bed.

An Explanatory Drawing is enclosed herewith, which illustrates the difference between Cash and the present invention with respect to flow configuration.

In Cash, the sieve tray restricts the backflow of H<sub>2</sub> (as disclosed in lines 1-4 in column 3 of Cash). Accordingly, in Cash H<sub>2</sub> introduced from the hydrogen injection device does not flow countercurrent to the oil from the first bed, but instead flows only cocurrent to the oil from the first bed. As shown in the upper portion of the Explanatory Drawing, oil (L) and gas (G<sub>1</sub>) are present in the first bed. However, only the oil (L) passes the sieve tray, while the gas (G<sub>1</sub>) including H<sub>2</sub>S and NH<sub>3</sub> is removed from the space over the sieve tray due to the presence of H<sub>2</sub> (G<sub>2</sub>) introduced into the space under the sieve tray. All of the H<sub>2</sub> (G<sub>2</sub>) introduced into the space under the sieve tray flow

downwardly cocurrent to the oil (L) passed through the sieve tray. The H<sub>2</sub> (G<sub>2</sub>) introduced into the space under the sieve tray is not introduced by Cash in such a way that it can somehow overcome the downward flow of oil (L) and flow the wrong way through the sieve tray into the upper, first bed.

In the present invention, on the other hand, as defined in claim 28, H<sub>2</sub> is introduced at a location disposed between the first bed (catalyst layer) and the second bed (catalyst layer), so that a first H<sub>2</sub> flow flows countercurrent to oil from the first bed and a second H<sub>2</sub> flow flows cocurrent to the oil from the first bed. Accordingly, as shown in the lower portion of the Explanatory Drawing, the introduced H<sub>2</sub> (G<sub>2</sub>) is separated into a stream G<sub>21</sub> flowing upwardly, countercurrent to oil (L), through the holding member and a stream G<sub>22</sub> flowing downwardly, cocurrent to the oil (L) from the first bed. In the present invention, H<sub>2</sub> (G<sub>21</sub>) as well as H<sub>2</sub>S and NH<sub>3</sub> (G<sub>1</sub>) are removed from the space over the holding member as shown in the drawing. Thus, in the present invention, unlike in Cash, stripping is performed in the space over the holding member.

Manifestly, gas flow, and in particular H<sub>2</sub> flow design, is completely different in the present invention from in Cash.

Method claims 28 and 30-32 were rejected under 35 USC §102(b) as being anticipated by, or alternatively, under 35 USC §103(a) as being unpatentable over US 4,430,203 (Cash). Method claim 29 was rejected under 35 USC §103(a) as being unpatentable over Cash in view of US 4,695,364 (Graziani). The rejections are respectfully traversed.

The Examiner recognizes that Cash is really not concerned with the same technology as are Applicants. However, he attempts to make a case that Applicants' process is inherently encompassed by the Cash disclosure, alleging that Cash's "hydrogen contacting with the processed feed between steps in conjunction with a vapor withdrawal is considered to inherently function as stripping". Office Action, page 4.

Cash teaches

Vapor withdrawal device 33 consists of a hollow ring having perforations 37 in its underside. The ring is connected to line 38. The vapors **pass** upwardly through the perforations into the lumen of the ring and flow therefrom into line 28.

Column 2, lines 56-60 (emphasis supplied). Looking at Figure 1 of Cash, line 28 feeds into a heat exchanger 32 and then through line 49 to join with reactor effluent. This is confirmed in lines 47-50 in column 3 of Cash.

In contrast, in the present invention,

... the hydrogen component comprising hydrogen sulfide, etc., is removed from peak 55 of high-pressure separation cell 53 and sent to hydrogen recycling unit 21 via flow meter 56

and flow adjustment valve 57. ... **Flow adjustment valve 57 is controlled** in accordance with the indication on flow meter 56 so that **quantity of flow is brought to the quantity of flow** with which adequate stripping is possible.

Page 17, first full paragraph (emphasis supplied). In other words, the present invention does not simply allow vapors to pass into an outflow line. (It is noted that the Examiner has not provided any evidence that that approach would result in stripping.) Instead, the present invention proactively controls the flow of the vapors in order to effect stripping. This is reflected in an expressly recited step in the presently claimed method - "adjusting flow of the vapor component produced from the first catalyst layer and the vapor component produced by stripping in order to perform the stripping".

With regard to claim 46 (valve tray), a valve tray cannot be introduced into the Cash system. A valve tray passes liquid components such as oil downwardly therethrough when the valve is lifted up by the pressure of hydrogen fed beneath the valve tray. See the specification, page 18, 16<sup>th</sup>-24<sup>th</sup> lines. If a valve tray were to be substituted for the sieve tray in Cash, the valve tray would not be lifted up - and the liquid component would not flow downwardly - because the sieve tray of Cash restricts the backflow of hydrogen. See Cash, column 3, lines 1-4. Therefore,

replacing the Cash sieve tray with the presently claimed valve tray would result in an inoperable prior art embodiment.

Neither Cash nor Cash in view of Graziani teaches or suggests **adjusting** vapor flow to perform stripping, as required by method claims 28-32 and 34. Also, neither Cash nor Cash in view of Graziani teaches or suggests recycling hydrogen recovered from the stripped vapor component, as required by method claim 34.

Apparatus claims 22, 23, 25-27, and 33 were rejected under 35 USC §102(b) as being anticipated by, or alternatively, under 35 USC §103(a) as being unpatentable over Cash. Apparatus claim 24 was rejected under 35 USC §103(a) as being unpatentable over Cash in view of Graziani. The rejections are respectfully traversed.

Cash teaches

Vapor withdrawal device 33 consists of a hollow ring having perforations 37 in its underside. The ring is connected to line 38. The vapors **pass** upwardly through the perforations into the lumen of the ring and flow therefrom into line 28.

Column 2, lines 56-60 (emphasis supplied). Looking at Figure 1 of Cash, line 28 feeds into a heat exchanger 32 and then through line 49 to join with reactor effluent. This is confirmed in lines 47-50 in column 3 of Cash.

In contrast, in the present invention,

... the hydrogen component comprising hydrogen sulfide, etc., is removed from peak 55 of high-pressure separation cell 53 and sent to hydrogen recycling unit 21 via flow meter 56 and flow adjustment valve 57. ... **Flow adjustment valve 57 is controlled** in accordance with the indication on flow meter 56 so that **quantity of flow is brought to the quantity of flow** with which adequate stripping is possible.

Page 17, first full paragraph (emphasis supplied).

In other words, the apparatus of present invention proactively controls the flow of the vapors in order to effect stripping. This is reflected in an expressly recited feature of the presently claimed apparatus. In claim 35, this feature is recited as "means for adjusting pressure of the separation space and/or a space between the holding member and the second catalyst layer". In claim 43, this feature is recited as "a separation space that is positioned at the bottom of the first catalyst layer for separation of vapor component and liquid component, wherein the separation space and/or a space between the holding member and the second catalyst layer can have its pressure adjusted". In claims 36 and 44, this feature is recited as "wherein said means for adjusting pressure comprises a flow meter and flow adjustment valve that are operatively connected to said gas outlet" and "a flow meter and flow adjustment valve operatively connected to said gas outlet for the adjustment of pressure in the separation space and/or the space between the holding member and the second catalyst layer", respectively.

With regard to claims 47 and 48 (valve trays), a valve tray cannot be introduced into the Cash system. A valve tray passes liquid components such as oil downwardly therethrough when the valve is lifted up by the pressure of hydrogen fed beneath the valve tray. See the specification, page 18, 16<sup>th</sup>-24<sup>th</sup> lines. If a valve tray were to be substituted for the sieve tray in Cash, the valve tray would not be lifted up - and the liquid component would not flow downwardly - because the sieve tray of Cash restricts the backflow of hydrogen. See Cash, column 3, lines 1-4. Therefore, replacing the Cash sieve tray with the presently claimed valve tray would result in an inoperable prior art embodiment.

Neither Cash nor Cash in view of Graziani teaches or suggests a feature that permits **adjusting** vapor flow to perform stripping, as required by apparatus claims 35-45. Also, neither Cash nor Cash in view of Graziani teaches or suggests means for recycling hydrogen recovered from the stripped vapor component, as required by apparatus claims 37 and 45.

With the above Remarks and amendments, it is believed that the claims as they now stand define patentable subject matter such that passage to Issue of the instant invention is warranted. A Notice of Allowance is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$120.00 is attached hereto.

If any questions remain regarding the above matters, please contact Applicant's representative, Richard Gallagher (Reg. No. 28,781) at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By   
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